

PROSPECTUS

Government Agencies Technology Exchange in Manufacturing (GATE-M)

INTERAGENCY PROGRAM REVIEW

June 24-25, 2003

The Government Agencies Technology Exchange in Manufacturing (GATE-M) will conduct an Interagency Program Review on June 24-25, 2003, at the National Institute of Standards and Technology in Gaithersburg, Maryland.

The purpose of the Review is to provide a forum for the federal agencies participating or interested in GATE-M to exchange program-level information about agency activities in the two areas that have been identified for joint address by GATE-M: *Intelligence in Manufacturing and Nano- / Micro-Scale Systems and Technologies*. The review will result in the identification of opportunities for collaboration, coordination, and leverage among the agencies in these areas, as well as the identification of agency priorities in the areas, along with gaps in addressing them.

The Review aims to cultivate a greater understanding within the agencies about the manufacturing R&D programs occurring across the federal government. The Review is seen as a vital step in fostering opportunities for interagency collaboration in specific areas to facilitate leveraged, coordinated, and even jointly planned and conducted efforts.

Additional information about the Review, including the agenda, is available on the GATE-M website, located at www.mel.nist.gov/gatem.

GATE-M Background

GATE-M is striving to represent the voice of federal interests in U.S. manufacturing. While there are a number of efforts and initiatives underway in the U.S. to coordinate various science and technology-related programs within and among federal agencies, GATE-M is unique. GATE-M is the only current national-level effort that is attempting to specifically and comprehensively focus on manufacturing research and development (R&D) activities conducted at, or funded through, federal agencies across the government. GATE-M facilitates the exchange of information related to the manufacturing R&D programs of its participating agencies, serving as a forum to identify and create opportunities for the coordination and leveraging of efforts.

GATE-M is not a funded federal initiative, nor is GATE-M a policy mandate.

The following agencies currently participate in GATE-M:

- The U.S. Department of Commerce, represented by the National Institute of Standards and Technology (NIST)

April 2003

- The U.S. Department of Defense, represented by the Office of the Secretary of Defense
- The U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE)
- The National Aeronautics and Space Administration (NASA), represented by the Marshall Space Flight Center (MSFC)
- The National Nuclear Security Administration (NNSA), a semi-autonomous branch of the U.S. Department of Energy
- The National Science Foundation (NSF), represented by the Directorate for Engineering

These six agencies are working through GATE-M to enable the federal government to address manufacturing technology issues systematically. GATE-M was initiated to:

- allow the federal agencies with a manufacturing component in their mission to exchange and leverage information about their technical programs;
- coordinate manufacturing R&D programs among federal agencies to facilitate collaboration when it makes sense to leverage resources in the address of particular issues; and
- provide a forum for the agencies to advocate for issues on an interagency, national-level.

The GATE-M Interagency Program Review will focus on Intelligence in Manufacturing and Nano- / Micro-Scale Systems and Technologies as the two issues that have been identified by the GATE-M Panel for joint address by the GATE-M agencies. These two issues were defined through a process that focused on identifying common interest and activity areas from among the priority manufacturing issues of each of the GATE-M agencies. Details of this definition process, as well as additional background information about GATE-M, can be found in the NIST report, Government Agencies Technology Exchange in Manufacturing (GATE-M), which is available on the GATE-M website at www.mel.nist.gov/gatem. The two issues are also summarized below.

Intelligence in Manufacturing

Within the context of GATE-M, Intelligence in Manufacturing represents an enabling, crosscutting technology area that is potentially transformative in terms of how manufacturing might be conducted in the future. All of the GATE-M agencies have programs currently in place that directly address this area or are directly relevant. This is an area where GATE-M could immediately begin to make an impact through joint address across the agencies.

Significant opportunity exists for manufacturing R&D to make a difference in this area. For example, this area could have a big potential impact on supply chain cost, quality, and reliability. Additionally, the manufacturing community is just beginning to tap the capabilities for manufacturing that are afforded by intelligent, open architecture control. There could also be significant opportunities for agencies with product-oriented missions

to apply technology developed elsewhere (i.e., at another GATE-M agency) to specific manufacturing problems in their product-specific domains.

This issue is intended to include all those technologies relevant to the development and incorporation of intelligent systems and controls into manufacturing operations. By intelligent control, researchers usually mean model-based sensing or model-based control, and the general focus of the research community is now on intelligent systems, rather than on limited individual aspects of sensing or control, including distributed control among multiple autonomous agents or machines.

Nano- / Micro-Scale Systems and Technologies

Nano- / Micro-Scale Systems and Technologies represents an area that is not highly mature, but where good opportunity exists for manufacturing R&D to make a difference. This relative lack of maturity means that this is an issue for GATE-M to address on a longer-term basis. This is a very important, emerging science and technology area that promises significant and broad impact to the future of U.S. manufacturing, as well as the U.S. economy and society on a large scale. This is an area with many manufacturing and systems issues, where GATE-M could likely find several ways to pull the missions of its participating agencies together. A number of electrical and mechanical application areas exist or are being investigated, and assembly areas and measuring techniques and tools could be fertile topics to pursue. GATE-M focus intends to stay aligned with manufacturing technology, as opposed to science.

Nanotechnology is generally considered to include research and technology development at the atomic, molecular or macromolecular levels, in the length scale of approximately 1 - 100 nanometer range, to provide a fundamental understanding of phenomena and materials at the nanoscale and to create and use structures, devices and systems that have novel properties and functions because of their small and/or intermediate size. Microtechnology generally includes systems and technologies relevant to microelectronics and microelectromechanical systems (MEMS).

Summary

The GATE-M Interagency Program Review will identify opportunities for collaboration, agency priorities, and gaps in addressing these priorities for each of the two technical areas covered. The Review will serve to cultivate a greater understanding within each of the agencies about the manufacturing R&D programs occurring across the federal government.

Program manager-level personnel from the GATE-M agencies will be the primary participants in the Review, and participation will be by invitation only. The GATE-M Interagency Program Review will consist of agency-level overview presentations, as well as specific program presentations from each agency. The Review will also include facilitated working sessions that are designed to identify agency priorities and gaps in the two areas covered.